THE MINERAL INDUSTRY OF

MALAYSIA

By John C. Wu

Malaysia's tin production, once the World's largest, ranked seventh in 1995. However, its tin reserves were still the World's third largest. Malaysia was the World's second largest producer of refined tin and the World's third largest exporter of liquefied natural gas (LNG). Other important minerals produced in Malaysia were barite, bauxite, coal, copper, dolomite, gold, ilmenite, iron ore, kaolin, limestone, manganese, mica, monazite, natural gas, crude petroleum, silver, silica sand, and zirconium in 1995. *(See table 1.)*

The mining industry, which contributed about 8% to Malaysia's gross domestic product (GDP), continued to grow in 1995 owing mainly to increased production of crude petroleum and natural gas. According to Malaysia's Department of Statistics, the output of the mining sector grew 9.1% in 1995 compared with 3.6% in 1994, while Malaysia's GDP grew 9.6% in 1995 compared with 9.2% in 1994. Malaysia's GDP, in 1978 constant dollars, was estimated at $48.1 billion,[1] of which about $3.8 billion was contributed by the mining sector in 1995.

Malaysia was a net-exporter of mineral products in 1995. Malaysia exported most of its mineral products to Japan and neighboring Southeast Asian countries. Bauxite was exported mainly to Japan, Taiwan, and Thailand. All copper concentrate was exported to Japan. Ilmenite was exported mainly to France, Japan, and South Korea. Refined tin was exported mainly to Japan, the Netherlands, and South Korea. LNG and crude petroleum were exported mainly to Japan. Importance of Malaysia as one of suppliers of crude petroleum and refined tin to the United States had diminished.

In 1995, export earnings were estimated at $72.1 billion, of which about $2.6 billion was from exports of crude petroleum and about $1.2 billion was from exports of natural gas (in the form of LNG). Other major mineral export earnings were $217 million from refined tin, $58 million from copper concentrate, $10 million from ilmenite, $5 million from kaolin, and $1 million each from bauxite and mica.

Malaysia's imports of nonfuel minerals, such as iron ore and tin concentrate, were mostly reexported after smelting. However, a considerable quantity of coal, heavy crude petroleum, nonferrous metals, and industrial minerals including gypsum, phosphate rock, potash, and salt were imported annually for domestic consumption.

Malaysia continued to import about 23,000 barrels per day (bbl/d) of heavy crude petroleum from the Middle East to meet the requirement for domestic refineries. Other important mineral imports in 1995 were iron ore, tin concentrate for reexport after smelting; cement clinker, gypsum, phosphate rock, potash, sodium carbonate, and sulfur for domestic consumption.

The structure of Malaysia's mineral industry remained unchanged from that of 1994. However, a manganese mine came on-stream in the State of Kalantan. *(See table 2.)*

According to the Malaysian Department of Mines, the number of workers employed by the major nonfuel minerals at the end of November 1995 was barite, 37; bauxite, 179; copper, 1,014; gold, 486; ilmenite, 49; iron ore, 154; kaolin, 479; limestone, 234; mica, 30; silica sand, 132; and tin, 1,848. In coal mining, there were 31 workers. According to the Malaysian Ministry of Human Resources, the total number of persons employed by the mining and quarrying industry was estimated at 39,200 in 1995. Because of increased employment in the construction and manufacturing sectors, Malaysia's total labor force rose to 8.1 million in 1995 from 7.8 million in 1994, while the unemployment rate decreased to 2.8% in 1995 from 2.9% in 1994.

In mining, production of bauxite increased slightly in 1995, but was less than 50% capacity. Johore Mining and Stevedoring Co. Sdn. Bhd., Malaysia's sole bauxite producer, operated a multiple-bench, open pit mine and a washing plant with a capacity of 1 million metric tons per year (Mt/yr) of ore and a work force of 180 at Bukit Raja near Pengerang Highway north of Sungai Rengit and east of Johore Bahru. According to the company, ore reserves in the Pengerang area were expected to be depleted by 1997. The company produced three grades of bauxite from the mining area: refractory, metallurgical, and cement. Most chemical- and metallurgical-grade washed bauxite were exported to Japan and the United States, while the cement-grade bauxite was sold as raw material to domestic cement manufacturers. Exports of bauxite increased to 170,000 metric tons (t) in 1995 from 163,600 t in 1994. Export earnings from bauxite were estimated at $1 million in 1995.

Production of copper concentrate by Mamut Copper Mining Sdn. Bhd. from the Mamut Mine in Sabah decreased to 87,000 t from 107,000 t in 1994 because of depleting ore reserves. The metal content of copper, gold, and silver in the concentrate was about 19,600 t, 1,500 kilograms (kg), and 10,900 kg, respectively, in 1995, compared with 25,267 t,

2,141 kg, and 13,061 kg, respectively, in 1994. Export earnings from copper concentrate were estimated at $55 million in 1995.

Production of gold decreased significantly in 1995 because of reduced output from the Tebedu area of southwestern Sarawak and from the Mamut Mine as byproduct of copper mining. Of the total gold produced in 1995, 48% was from the Mamut copper mine in Sabah; 36% was from 10 to 12 small-scale gold mines operating in the States of Kelantan, Pahang, and Terengganu; and 16% was from 2 gold mines in Sarawak.

Following completion of an extensive drilling program, the Canadian-based Avocet Ventures Inc.(AVI) decided to develop its Penjom gold property (block 7) in central Pahang. AVI also planned to build a carbon-in-leach treatment plant with an ore throughput capacity of 500,000 metric tons per year (t/yr). The total project cost including associated infrastructure was about $17 million, of which $4 million will be from AVI's internal sources, and the remainder will be financed by a loan from the Macquaries Bank Ltd. of Australia. The project feasibility was based on ore reserves of 2.01 million metric tons (Mt) at a grade of 4.42 grams per metric ton of gold. Under the company's plan, gold production was scheduled to begin in October 1996.[2]

For gold exploration, the State Government of Pahang approved 22,700 hectares (ha) of land in 1995 and planned to open up an additional 78,600 ha of land in 1996. Since 1990, about 30 mining licenses had been approved to explore for gold in Malaysia. The major mining companies involving gold exploration in Pahang were Damar Consolidated Exploration Sdn. Bhd., Malaysia Mining Corp. Bhd., Tshu Lian Shen Mining Sdn. Bhd., Avocet Ventures Inc. of Canada, Western Resources, Valiant Consolidated Ltd., Montague Gold, Target Resources, and the Vista Development Sdn. Bhd. A joint exploration by the Geological Survey of Malaysia and the Metal Mining Agency of Japan indicated gold mineralization in South Imbak subarea of central Sabah. The joint exploration in Sabah was expected to continue in 1996.

Production of iron ore decreased slightly in 1995. According to the Malaysian Department of Mines, most of the 1995 production was from six operating mines in the States of Johor, Kedah, Pahang, and Perak. About 10% of the 1995 iron ore production was recovered as a byproduct of tin mining.

Most of the iron ore production was consumed domestically by Malayawate Steel Bhd. and several cement companies as raw material. To meet the raw material requirements for its iron and steel industry, Malaysia imported annually about 1 Mt of iron ore mainly from Bahrain, Brazil, Chile, and Sweden and between 100,000 t and 150,000 t of pig iron from China, India, Japan, Switzerland, Ukraine, and other countries. Malaysia also imported annually between 700,000 t and 1 Mt of iron and steel scrap principally from the United Kingdom and the United States. Imported iron ore was consumed by the direct reduction (DR) plants in Kemaman, Terengganu, and on Labuan Island, offshore Sabah. Pig iron and iron and steel scrap were consumed by Perwaja Steel Sdn. Bhd. (PS) and other major producers of steel billet in peninsular Malaysia.

Malaysia's iron and steel industry had a total crude steel capacity of more than 2 Mt/yr, in the form of steel billet, with two charcoal blast furnaces, eight electric arc furnaces, and two DR plants. Gunawan Iron and Steel Sdn. Bhd. (GIS), which planned to construct a steel slab plant at the Telok Kalong Industrial Estate near Kemaman in Terengganu, revised the planned capacity of its steel slab plant to 1.35 Mt/yr from 1.8 Mt/yr and postponed its startsup to mid-1998. However, GIS had completed 95% construction of a 250,000 t/yr plate mill at the Telok Kalong site. GIS planned to bring its plate mill on-stream in May 1996 and import slab feed for the mill until its own slab plant is completed in 1998.

PS, Malaysia's only integrated steel producer, was in financial difficulties. According to the Malaysia Government, PS reported a loss of $148 million in fiscal year 1995 owing to large depreciation writeoffs, high-interest payments, and frequent shutdowns at Perwaja's plants. According to Finance Ministry, since 1988, PS had an accumulated loss of about $980 million by the end of fiscal year 1995 and made a profit only in 1990.[3] As a result, PS had appointed a new managing director to review or put on hold the company's plans to expand mill capacity at Gurun, Kedah and other expansions at Kemaman, Terengganu.[4]

Malaysia's tin mining industry was stagnant in 1995. According to Malaysia's Department of Mines, the monthly output of tin averaged 533 t in 1995 compared with 538 t in 1994, although the average tin price on the Kuala Lumpur Tin Market was slightly higher in 1995 than in 1994. According to the Malaysian Chamber of Mines, the prospect of higher tin production in 1996 will very much depend upon the tin price. If the tin price were to stay at $7.00/kg or more, then Malaysia could produce about 10,000 t/yr of tin.

Of the total tin produced in 1995, 17% was by dredging, 43% by gravel pumping, 24% by open pit, 10% by panning, and 6% by amang retreatment and underground mining. The total number of operating mins increased from 39 in January 1995 to 40 in May. However, the tin mining industry's total labor force declined to 1,848 in November 1995 from 2,068 in November 1994. During 1995, there were 4 dredges, 21 gravel-pumping units, 14 open pit mines, and 2 underground mines operating.

For tin metal production, Malaysia continued to import foreign tin ore and concentrate to supplement the shortfall in domestic ore production. The ratio of foreign tin ore to domestic ore was about 80 to 20 with a total smelter's intake of 67,346 t in 1995. For the first 8 months, imports of tin-in-concentrates amounted to 24,327 t in 1995 compared with 23,877 t in 1994. To meet the growing demand for high-purity tin by the producers of electronic products in Europe

and Asian, Malaysia Smelting Corp. Bhd. was expanding the monthly electrolytic refining capacity of 4N (99.99%) tin metal to 30 t from 10 t at Butterworth, Penang, in 1995.[5]

According to the Malaysian Department of Mines, domestic demand for refined tin rose to 6,370 t in 1995 from 5,614 t in 1994. Of the total domestic tin consumption, about 50% was consumed by the solder industry, 21% by the tinplating industry, 10% by the pewter industry, and 19% by others.

Malaysia's cement production reached a new high in 1995, when its economy was growing rapidly with a booming construction industry. In 1995, Malaysia's cement clinker capacity was 8.6 Mt/yr with a total cement grinding capacity of 11.9 Mt/yr. Malaysia's major cement companies operated their own limestone quarries mainly at Padang Rengas and Kinta of Perak, at Baling and Langkawi of Kedah, and at Puchong and Rawang of Selangor in peninsular Malaysia.

Malaysia's demand for cement continued to grow in 1995 because of heavy investment in the public works and commercial buildings projects in 1995. Because of a cement shortage of about 220,000 t in 1995, the Government approved a 10% increase in domestic cement price from the Government-controlled rate of about $71/t to encourage domestic cement producers to boost their output.

In early 1996, Kedah Cement Holdings Bhd. was expected to bring on stream a new 1.8 Mt/yr production line at Kangar in Perlis. Additionally, Associates Pan Malaysia Cement Sdn. Bhd. was planning to expand its plant capacity at Kantan in Perak by adding a new 2- Mt/yr kiln at a cost of $280 million. Perak-Hanjoong Simen Sdn. Bhd. and Tasek Cement Bhd. also were planning to add 1.5 Mt/yr each to their capacity by 1998.[6]

In 1995, about 78% of ilmenite was recovered as a byproduct from tin tailing treatment plants operating in the States of Perak and Selangor. The remaining 22% was produced from two operating mines in the State of Terengganu. Under an agreement signed in June, Malaysia Mining Corp. (MMC), in partnership with Vietnamese state-owned Binh Dinh Mineral Co., is to explore for ilmenite and develop a mine at Catkhanh in Quinhon, central Vietnam. The $1.8 million exploration and development project will be owned 60% by MMC and 40% by the Vietnamese company. Ore reserves at the Cathhanh ilmenite mine also contain a high percentage of monazite and zircon.[7]

Tioxide (Malaysia) Sdn. Bhd., established in 1988, began production of titanium dioxide pigment using the sulfate process at the Telok Kalong Industrial Estate in May 1992. The output of titanium dioxide pigment reached 86% of the plant capacity in 1995. The company, having a work force of 250 and capacity of 50,000 t/yr, could easily increase its plant capacity from 50,000 t/yr to 75,000 t/yr by upgrading the existing facility. Beginning in December 1994, the Malaysian Government imposed a 15% tariff on imports of titanium dioxide pigment to help Tioxide boost its Malaysia's market share to about 85%. The Government also provided a 10-year tax holiday to Tioxide.[8]

Malaysia's production of natural gas ranked 12th in the World, accounting for about 1.2% of the World's total output in 1995. Malaysia's natural gas production reached a new record owing to increased consumption by the manufacturers of LNG, nitrogen fertilizer, and petrochemical as feedstocks; and increased consumption by the power, industrial, commercial, and residential sectors as energy sources.

Production of LNG by Malaysia LNG Sdn. Bhd. was at full capacity. In 1995, all of the 10 Mt of LNG exports went to Japan and South Korea under long-term contracts. In December 1994, Petroliam Nasional Berhad (PETRONAS) signed a new 20-year contract with Tokyo Gas Co., Osaka Gas Co., Toho Gas Co., and Kansai Electric Power Co. of Japan to supply 2.1 Mt/yr of LNG to the Japanese utility companies starting in 1995. Malaysia's second LNG plant, with a capacity of 7.8 Mt/yr and under construction by a consortium led by M. W. Kellog Co. of the United States at Bintulu, was expected to come on-stream in 1996. The second LNG plant will be opreated by Malaysia LNG Dua (MLNG-2). MLNG-2 is owned by PETRONAS (60%), the State-owned oil and gas company, Shell Gas NV (15%), Mitsubishi Corp. (15%), and Sarawak State government (10%).

For exporting LNG from the second LNG plant, PETRONAS signed a 20-year contract, valued at $9 billion, with Chinese Petroleum Corp. of Taiwan to supply 2.25 Mt/yr of LNG starting in 1996. In December 1995, PETRONAS signed an agreement with Nippon Oil Co. of Japan, Royal Dutch/Shell of the Netherlands, and Occidental Petroleum Corp. of the United States to supply natural gas from gasfields offshore Sarawak to the planned third LNG plant, with a capacity of 6.8 Mt/yr, at Bintulu, Sarawak. To own and operate the third LNG plant, a joint-venture firm, Malaysia LNG Tiga Sdn. Bhd. (MLNG-3), was established. MLNG-3 is owned 70% by PETRONAS, 10% each by Nippon Oil, Royal Dutch/Shell, and Occidental Oil Corp. The future LNG production from the third LNG plant will be exported to China, India, Japan, South Korea, the Philippines, Taiwan, and Thailand beginning in 2001.[9]

Malaysia's crude petroleum production ranked 21st in the World, accounting for about 1% of the World's total in 1995. The 1995 output including condensate reached a record high of 694,300 bbl/d owing to increased output from new oilfields offshore Sarawak and Terengganu. Crude petroleum production was by PETRONAS Carigali Sdn. Bhd. (PETRONAS CAG), the upstream arm of PETRONAS, and three foreign contractors, Esso Production Malaysia Inc. (EPMI), Sarawak Shell Bhd. (SSB), and Sabah Shell Petroleum Co. Ltd. (SSP). About 57% of crude petroleum output was by EPMI and a joint venture of EMPI and PETRONAS CAG from oil and gasfields offshore Terengganu. The remaining 43% was by SSP, SSB, and a joint venture of SSB and PETRONAS CAG from oil and gasfields offshore the States of Sarawak and Sabah. In June,

the joint venture of EPMI (78%) and PETRONAS CAG (22%) brought on stream the Guntong D platform with 40 wells to produce 80,000 bbl/d offshore Terengganu.

PETRONAS CAG announced that it made two new discoveries in 1995. One, in joint ventures with International Petroleum Corp. (58.6%) in the Bunga Kekwa-1, PM3 block, offshore peninsular Malaysia, tested at a combined rate of 10,212 bbl/d of oil and 5.08 million cubic meters of natural gas. Another in the Tanjung Baram-1, block SK15, offshore Sarawak, tested at a combined rate of 4,250 bbl/d of oil and 274,500 cubic meters of natural gas.[10]

Export earnings from crude petroleum were at the same level as that of 1994. Singapore, Japan, South Korea, Japan, and Thailand remained the major buyers of the Malaysia crude petroleum in 1995. Malaysia continued to import about 22,000 bbl/d of heavy crude oil in 1995 to meet the requirement for its domestic oil refineries.

In January, PETRONAS awarded a $690 million contract to build its second refinery to a consortium of Chiyada Corp. and Mitsui & Co. Ltd. of Japan, and MMC Engineering Service of Malaysia. The contract was for design, procurement, construction, and commissioning of a 100,000 bbl/d oil refinery exclusively for export in Malacca by 1997.[11]

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[1]Where appropriate, values have been converted from Malaysia ringgits (M$) to U.S. dollars at the rate of M$2.62=US$1.00 in 1994 and M$2.51=US$1.00 in 1995.

[2]South-East Asia Mining Letter (London). "Malaysia, Avocet to Develop Penjom." V. 7, No. 23, Dec. 15, 1995, p. 5.

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[4]The Text Report (Tokyo). "Malaysia's Perwaja Steel in Financial Trouble." V. 27, No. 6467, Oct. 27, 1995, p. 9.

[5]South-East Asia Mining Letter (London). "Malaysia's High-Purity Tin Output to Triple." V. 8, No. 2, Jan. 26, 1996, p. 7.

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[8]Chemical Week. Focus on Malaysia. June 21, 1995, p. 22.

[9]The Text Report (Tokyo). "Nippon Oil, Partners to Build New LNG Export Project in Malaysia." V. 27, No. 6499, p. 1.

[10]Petroleum Economist (London). V. 62, No. 1, Jan. 1995, p. 36, and V. 62, No. 7, July 1995, p. 36.

[11]The Journal of Commerce. "Malaysia Awards Refinery Contract to Japanese Group." V. 403, No. 28409, Feb. 9, 1995, p. 5B.

Major Sources of Information

The Ministry of Primary Industry:
- Department of Mines
  - 11th Floor, W Block,
  - Wisma Selangor Dredging
  - 142 C, Jalan Ampang,
  - 50656 Kuala Lumpur, Malaysia
  - Telephone: 60-3-261-1400
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- Geological Survey of Malaysia
  - 20th Floor, Tabung Haji Bldg.
  - Jalan Tun Razak, P.O. Box 11110
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Major Publications

Ministry of Primary Industry

Department of Mines: Statistics on Mining Industry in Malaysia, monthly and Bulletin on Mining Statistics, quarterly.

Geological Survey of Malaysia: Annual Report, and Malaysia Minerals Yearbook.

Department of Statistics: Statistical Bulletin, Malaysia, monthly; Yearbook of Statistics, Malaysia; Statistical Bulletin, Sarawak, annual; and Statistical Bulletin, Sabah, annual.

TABLE 1
MALAYSIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/		1991	1992	1993	1994	1995 p/
METALS						
Aluminum: Bauxite, gross weight	thousand tons	376	331	269 r/	162	184
Copper, mine output, Cu content (Sabah)		25,605	28,556	25,182	25,267	21,900 e/
Gold, mine output, Au content:						
Malaya	kilograms	871	774 r/	873	1,038 r/	1,166
Sabah	do.	1,615	2,215	2,042	2,141	1,535
Sarawak	do.	291	524 r/	1,547	906 r/	460
Total	do.	2,777	3,513	4,462	4,085 r/	3,161
Iron and steel:						
Iron ore and concentrate	thousand tons	376	320	246 r/	243 r/	202
Steel, crude	do.	1,130	1,559	1,808	2,046 r/	2,300 e/
Manganese, gross weight		--	--	--	--	37,600
Rare-earth metals: Monazite, gross weight		1,981	777	407	425	814
Silver, mine output, Ag content						
Sabah	kilograms	13,262	15,076	13,663	13,061	10,900
Sarawak 3/	do.	169	250	350	281	180
Total	do.	13,431	15,326	14,013	13,342 r/	11,080
Tin:						
Mine output, Sn content		20,710	14,339	10,384	6,458	6,402
Metal, smelter		42,722	45,598	39,984 r/	38,119 r/	39,454
Titanium:						
Ilmenite concentrate, gross weight		336,347	337,744	288,950	115,885	151,680
Dioxide		--	690	22,854	36,000	43,000 e/
Tungsten, mine output, W content		2	3	2	--	--
Zirconium: Zircon concentrate, gross weight		5,579	2,608	2,184	1,656	3,790
INDUSTRIAL MINERALS						
Barite		16,600	10,525	11,551	17,144	16,966
Cement, hydraulic	thousand tons	7,451	8,366	8,797	9,928 r/	10,667
Clays: Kaolin		186,699	244,573	249,852	252,628	211,182
Mica		3,517	4,754	4,659	4,993	5,848
Nitrogen: N content of ammonia		286,200	331,100	333,700	334,000 e/	340,000 e/
Silica sand (Malaya and Sarawak)		668,244	579,491	355,389	230,756	287,515
Stone:						
Dolomite		18,115	25,400	27,800	37,700	28,100
Limestone e/	thousand tons	20,700	22,000	23,000	24,000	26,000 e/
MINERAL FUELS AND RELATED MATERIALS						
Coal	do.	64	74	264	174	112
Gas, natural: 4/						
Gross	million cubic meters	21,150	22,550	28,174	30,251	36,500 e/
Net 5/	do.	16,261	18,186	21,648	24,397	28,100 e/
Petroleum: 4/						
Crude	thousand 42-gallion barrels	238,293	240,541	235,425	238,491	253,420
Refinery products:						
Gasoline	do.	13,379	13,490	14,664	15,879 r/	18,640 e/
Jet fuel e/	do.	3,000	3,000	3,100	3,200	3,300
Kerosene	do.	6,897	7,097	8,257	12,026 r/	14,360 e/
Diesel	do.	28,026	29,421	31,458	38,490 r/	43,580 e/
Residual fuel oil	do.	13,997	13,995	15,901	14,416 r/	15,000 e/
Other e/ 6/	do.	12,500	13,000	13,000	14,000 r/	15,000
Total	do.	77,799	80,003	86,380	98,011 r/	109,880 e/

e/ Estimated. p/ Preliminary. r/ Revised.

1/ Table includes data available through May 28, 1996.

2/ In addition to the commodities listed, a variety of crude construction materials (clays, sand and gravel, and stone), fertilizers, and salt is produced, but not reported, and available information is inadequate to make reliable estimates of output levels.

3/ Byproduct from gold mines in Sarawak.

4/ Includes production from Malaya, Sabah, and Sarawak.

5/ Gross less volume of reinjected and flared.

6/ Includes LPG, naphthas, and lubricants.

Source: Ministry of Primary Industry, Department of Mines (Kuala Lumpur). Monthly Statistics on Mining Industry in Malaysia, Monthly, 1995; Quarterly Bulletin, Quarterly, 1995.

TABLE 2
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995

(Thousand metric tons unless otherwise specified)

Commodity		Major operation companies and major equity owners	Location of main facilities	Annual capacity
Bauxite		Johore Mining and Stevedoring Co. Sdn. Bhd. (61% owned by Aluminium Ltd. of Canada, 39% by local investers and other)	Bukit Raja-Pengerang, Johor	400
Cement		Associated Pan Malaysia Cement Sdn. Bhd. (equally owned by Malaysia Cement Bhd. and Pan-Malaysia Cement Work Bhd.)	Rawang, Selangor and Kantan, Perak	2,800
Do.		Cement Industries of Malaysia Bhd. (publicly owned company)	Kangar, Perlis	1,600
Do.		Kedah Cement Holdings Bhd. (majority owned by Bolton Bhd. and minority by general public shareholders)	Langwai, Kedah	1,500
Do.		Perak-Hanjoong Simen Sdn. Bhd. (60% owned by Korea Heavy Industries and Construction Co., and 40% by Perak State Government)	Padang Rengas, Perak	1,200
Do.		Tasek Cement Bhd. (publicly owned company)	Ipoh, Perak	1,500
Copper, concentrate		Mamut Copper Mining Sdn. Bhd. (wholly owned subsidiary of Mega First Corp. Bhd.)	Mamut, Sabah	100
Gas:				
Natural	million cubic meters per day	Esso Production Malaysia Inc.	Offshore Terengganu	22.7
Do.	do.	Sabah Shell Petroleum Co. Ltd.	Offshore Sabah	2.8
Do.	do.	Sarawak Shell Bhd.	Offshore Sarawak	38.5
Liquefied		Malaysia LNG Sdn. Bhd. (60% owned by PETRONAS, 17.5% by Shell Gas N.V., 17.5% by Mitsubishi Corp., and 5% by Sarawak State government)	Tanjung Kidurong, Bintulu, Sarawak	9,600
Petroleum, crude	million 42-gallon barrels per day	Esso Production Malaysia, Inc.	Offshore Terengganu	390
Do.	do.	Sabah Shell Petroleum Co. Ltd.	Offshore Sabah	100
Do.	do.	Sarawak Shell Bhd.	Offshore Sarawak	184
Do.	do.	PETRONAS Carigali Sdn. Bhd.	Offshore Terengganu	22
Steel, crude		Perwaja Steel Sdn. Bhd. (Government owned)	Kemaman, Terengganu	1,200
Tin:				
Concentrate		Rahman Hydraulic Tin Bhd. (privately owned company)	Klian Intan, Perak	1
Do.		Petaling Tin Bhd. (wholly owned subsidiary of Malaysia Mining Corp.)	Kuala Langat, Selangor	2
Do.		Tima Langat Bhd. (65% owned by Selangor State government and 35% by Malaysia Mining Corp.)	do.	1
Refined		Escoy Smelting Sdn. Bhd. (formerly Datuk Kermate Smelting Bhd. ehich is 50.5% owned by Amalgamated Metal Corp.,29% by Consolidated Tin Smelter Ltd., and 20% by Malaysia Mining Corp.)	George Town, Penang	20
Do.		Malaysia Smelting Corp. Bhd. (37.44% owned by The Straits Berhad Trading Co., Ltd., 37.44% by Malaysia Mining Corp., and 25.12% by other)	Butterworth, Penang	60
Titanium, oxide		Tioxide (Malaysia) Sdn. Bhd. (85% owned by Tioxide Group PLC and 15% by Terengganu State Government)	Kemaman, Terengganu	50